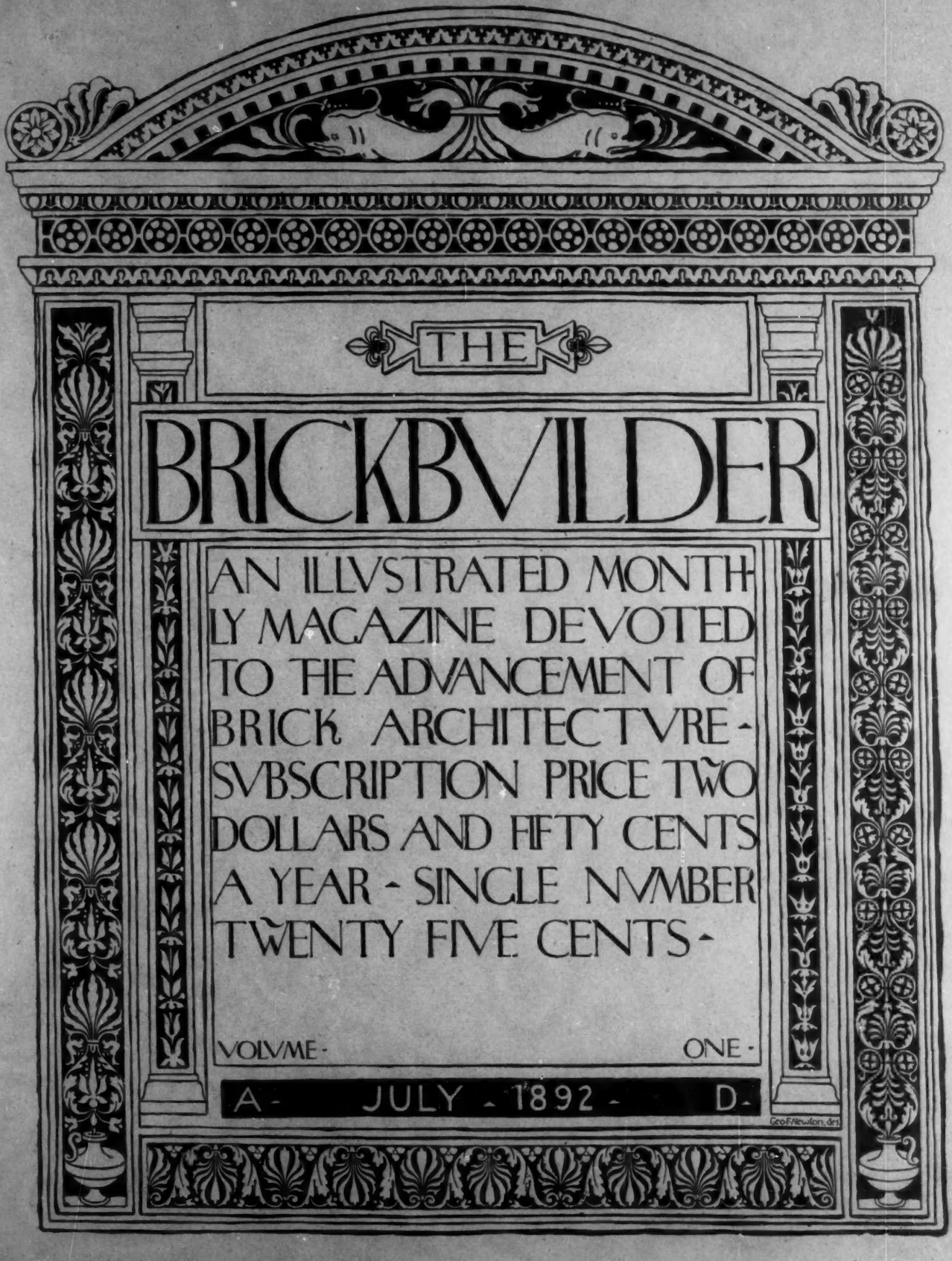
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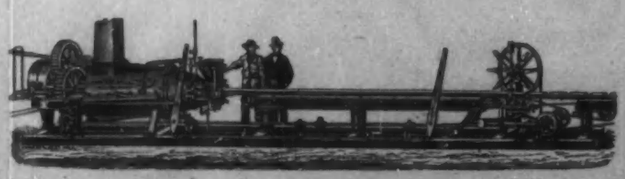

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The Brickbuilder.

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The editors feel much encouraged by the successful outcome of THE BRICKBUILDER competition for cornice designs, and hope that the happy augury will be fulfilled in the contests which are to follow. Certainly these designs show that there is no lack of ability or fancy among our younger designers. It often happens, indeed, that our architects are more successful in handling a piece of detail than in the designing the mass of a whole building. Yet the principles of design are the same in both cases. If we can only learn the dignity of restraint and the beauty there is in simplicity of design, if we only can come to realize the importance of right proportions of mass as well as of detail, and if we will only have the patience to give to our designs the careful study they deserve, there is every reason to hope for the best for our architecture. By means of good designs we shall gradually educate and elevate the public taste. At present the public, more than the designers, are to blame for the ugly, insipid, and restless buildings which so often disfigure our streets. There are enough good designers to cover the country with the best designs, if the public only had the appreciation to employ them.

It too rarely happens that our brick masons have any proper appreciation of their own work. To lay a given number of bricks in a given time is generally the highest ambition of the most conscientious, and under the *régime* of the trades unions to lay as few bricks as may be in a given time seems generally the result aimed at. We regret to think that the trades unions are largely responsible for the deterioration in the quality of our workmen. In most cases they directly encourage incompetence. Only recently the following case came to our notice: A bricklayer was at work laying a portion of wall of somewhat difficult and complicated design. It needed a man not only skilled in his work, but one who had some appreciation of the beauty of what he was at work upon, one who would take a pride not only in doing his best from a mechanical point of view, not only in producing what would be called a "workmanlike job," but one who would take some pleasure in following the design he was executing and seeing that it came out well. The fellow that was engaged upon this piece of work, so far from being what we have described, was not only indifferent and careless, anxious only to make time, but was utterly incompetent.

The difficult piece of work he was upon had to be pulled down, it was so badly executed. The foreman, having some pride and conscience in the matter, removed the incompetent workman, not from the job altogether, but merely to another part of the work, where he would have plain sailing and less chance for mischief. At once all the other bricklayers declared that that bricklayer must be put back or they would "strike." Explanation proved useless, and to avoid stopping the work altogether, the botcher had to be set to spoiling his work a second time. This is no unusual instance of the way in which the unions encourage bad work and bad workmen. The unions, properly conducted, might raise instead of lowering the standard of work, and might thus be of the greatest benefit, not only to the men, but to the trade. The true interests of no good workmen are advanced by the present methods, the tendency of which is to prevent men from rising where they deserve to rise.

Notwithstanding the fact that America is essentially a timber country, the merits of brick as a building material are rapidly becoming better understood. Experience has shown that the durability and strength of brick make its use cheaper in the end, although the first cost is greater than that of timber.

The extent to which brick was used in the erection of the cheaper class of buildings, where the choice was between timber and brick or stone, has heretofore been largely dependent upon geological conditions. In such places as Philadelphia and St. Louis, where an abundance of excellent brick earth is found, the majority of buildings have been erected in brick, as in the nature of things; but with the rapidly increasing facilities for the shipping of freight, brick will be used in places remote from the brickmaking centres, and that too in the commonest description of buildings.

In the erection of buildings where low cost is a *sine qua non*, timber is often employed to the exclusion of brick, simply because to use the latter, and at the same time keep the cost within the prescribed limits, would mean using bricks of very inferior quality, and these would not last much longer than timber. There is a way of using good bricks, and yet of keeping the cost low, and that is by employing hollow bonds.

These bonds can only be used in one-brick walls. There are two methods of laying them. The first is to lay all the bricks on edge, laying first a header and then a stretcher, and so on throughout the course. The course above is laid exactly in the same way with the headers in the centre of the stretchers below them; the ends of the courses being closed up with closers of the necessary length. The second method of forming hollow bond is first to lay a course of headers, and then upon it a course of stretchers on edge. This is followed throughout the wall, there being headers flat, and stretchers on edge alternately.

Both systems of laying brick produce a fairly strong wall that will safely carry all ordinary weights. For fence walls they may be used with advantage, and for a number of other purposes may be safely employed.

Hollow bonds are not recommended to take the place of solid walls, excepting where it is necessary to keep the cost low, and where it would be necessary to use an inferior brick if the wall were built solid. Hollow walls erected of good bricks are much superior to solid walls constructed of poor bricks.

The June number of *Scribner's Magazine* has an interesting article on "Life in New York Tenement Houses," by William T. Elsing. We do not refer to this with the intention of perpetrating any such incongruity as the discussion of social questions in a

technical journal, but in order to point out an incongruity still more ridiculous, if it were not so saddening, which is too often perpetrated, not only in New York, but in other of our large cities. In the course of the article we refer to is an illustration, entitled "A New Tenement House of the Better Sort." It shows an ugly, pretentious brick building overloaded with hideous terra-cotta, which we suppose its architect would call ornament. What heartless irony the erection of a pretentious monstrosity such as this for the occupation of poor people, who doubtless have increased rent wrung from them to pay the interest on the cost of the ugly and elaborate detail! Could there be a more striking example of the want of taste, the absence of any sense of fitness, the craving for mere display, the heartless vulgarity which is characteristic of certain elements in the community? There is no possibility of any permanent and vital progress in art until the characteristics exemplified in such buildings as this cease to be conspicuous traits of the public character. We admit that this is an extreme example, but is unfortunately not an uncommon one, and we refer to it because we think the want of taste here shown, the incongruity, are more palpable than in many other instances which perhaps are really just as bad. It is easy here for any one to point the moral to the tale, and the vices of such a building as this bring out in stronger relief the desirability of the opposite qualities. A decently plain, strictly utilitarian building, whose effect should depend on pleasant proportion and mass, and relation of voids to solids, and whose detail should be of the very simplest, all in plain brick, would not only be more appropriate for a tenement house, but could not fail to be less ugly, and might even have a certain beauty. Certain it is that it is useless to attempt elaborate beauty in our architecture until we can appreciate the beauty there may be in perfectly simple design, until display ceases to be regarded as synonymous with beauty, until there exists a delicate feeling for the fitness of things, which is shocked at the incongruity as well as the ugliness of such buildings as we have referred to.

In considering the respective merits of different systems of bonding, there is one rule that may be invariably applied, and that is the extent to which the vertical joints come over one another. In a perfect bond no two joints will come over one another in any part. To understand this, imagine that a knife is thrust down vertically between a mortar joint. If the bond is a perfect one, the knife can only descend one course without striking a brick, while in less perfect bonds it may go the whole length of the wall. In running bond that is commonly used in the United States, the knife could be thrust down four, six, or eight courses, depending upon the extent to which headers were used.

OF INTEREST TO MASONS AND BUILDERS.

Any of you can build a plain wall and build it well. If you can't, there is no use in reading further. What follows is for the progressive, wide-awake builder, who takes every chance to get ahead. Then let us repeat, any of you can build a plain brick wall. Every wall has a top, and some walls have holes in them; in fact most of them do. When a wall is in a building, its top is a cornice, its holes are doors and windows. Very often the party you are building the wall for wants some ornament on it, and you use your bricks to produce patterns that will make the doors, windows, and cornice more attractive. Where do you get your ideas? From some other builder in your town? If so they are second hand. Do you get them up yourself? If so they cost you lots of time. Time is money, and if you can buy these for about a hundredth of what your time costs you, you are a big gainer. Perhaps your first ideas do not suit the owner. Then you must spend more time. Suppose, now, you are building a store front: you are up to the cornice, and the owner wants to know what it is going to be; perhaps you yourself haven't had time to decide just how you will make it. But you have a book of designs, for instance, this copy of THE BRICKBUILDER. You take it to him and say, "Here are forty-five ideas; which do you like best?" If he can't find one he likes, he is hard to suit. Suppose, though, you are only up to the windows of the second story, you must get up an idea, *unless* you take this paper regularly. If you do you will find designs for dozens of windows among the hundred or more plates of designs published each year. You may want a cornice, a door, a window, a string course, a panel, a fireplace, an outside chimney, or a simple chimney-top; you are almost certain to find a lot to choose from in some number of this paper. Take the case of a chimney-top; you may know how to build only one kind, but if you can build twenty-five, fifty, or one hundred kinds, don't you stand a better show of getting the chimneys of a frame building to build than a mason builder who knows only one or two patterns?

Every trade has its papers, except that of bricklaying. Carpenters have dozens of publications containing designs for all kinds of frame buildings and all kinds of wood details. The dressmaker has her papers showing new patterns for dresses, and she can show these to her customers for them to select what they wish. And so on through all lines of business. The mason builder whose work, when well done, is the best, the most durable, and, in the end, the cheapest, had nothing of the kind until THE BRICKBUILDER was started. It is the only periodical in the world devoted to mason builders' and contractors' work. It is worth its cost to them many times over.

These are its strong points: It is published monthly, and contains every year 100 or more full plates of practical designs and details for brick buildings. Besides details, it publishes working plans and elevations for all sorts of brick buildings. Some of these are actually built by prominent architects, others are the result of competitions for prizes, as the cornices in this number are. The next number will contain designs for chimney-tops and windows, as this one does of cornices. Then will come other details, and a little later, a number full of designs for $2,000 brick houses. We had just decided to offer prizes for designs for a brick house, when we received the very timely letter from Savannah, Ill., reprinted on page 54.

Right here let us say that this paper is in no way intended to supply the services of practising architects. Where the services of a good architect are obtainable, THE BRICKBUILDER advises owners to employ him, and pay for his services at their full value. It will be money in the owner's pocket to do so. But in all small towns and in many cities much work is done where professional service is not easily obtainable. To those builders who are often obliged to work without an architect's guidance in such cases, THE BRICKBUILDER is invaluable.

For a year this paper costs only $2.50. Besides its practical designs and details, it contains much interesting and valuable reading matter. Its numbers are always useful. You can keep this number, and find use for these designs of cornices next year, or the year after, as much as at the present. At any time the companies whose bricks are to be used will quote you prices if you write them as directed on page 54. If you think this number is worth saving, you would think the same of every number. Send $2.50 for the whole year of 1892, including back numbers, or $1.25 for the last six months of the year. We have only a few complete sets; each number is full of useful things, and worth many times the cost. The April number, for instance, contains designs for arched doorways, also two-story brick store fronts. The May number, plan, elevations, and details for a brick church.

By sending $2.50, you get the paper beginning with the first number, and so get all the designs published. If you get this paper rolled, remember only sample copies are sent rolled; all subscribers get their papers flat, sent through the mails protected with pasteboard.

THE BRICKBUILDER PUBLISHING CO.

Box 3282, Boston, Mass.

DRAWINGS OF ENGLISH BRICKWORK.

The majority of architects in this country are well acquainted with the interesting brick and terra-cotta work Messrs. Ernest George & Peto have been doing in England. These architects stand among the very foremost for good domestic work, and their work has widespread reputation. We have just received some scale drawings of a number of their best buildings, including Shiplake Court. These drawings will be published in early issues of THE BRICKBUILDER.

THE STRENGTH OF MORTAR.

Some years ago a peculiar accident happened in New York City. A building used for the storage of flour fell down one Sunday night without any apparent cause. The writer went to the site of the fallen building early the next morning and made a careful inspection. The front wall had fallen bodily into the street, carrying with it the greater part of the side walls, but leaving the back wall intact. Barrels of flour, bricks, and mortar were all mixed together in confusion. On looking at the bricks it was found that they were of very good quality; they gave out a good, clear ringing sound when struck together, and appeared to be in every way of first-class quality. The mortar, however, was evidently very inferior. Portions of it taken between the thumb and finger could be crushed with very little pressure. The heap of *débris* was suggestive. Hardly two bricks could be seen clinging together; many of them were as clean as the day they were laid, while the mortar, in amongst the rubbish, was nearly all in a state of powder. It was not difficult to arrive at the conclusion that bad mortar was in some way responsible for the fall of the building. Inquiry of the owner of the place brought to light these facts: First, that the usual custom of storing barrels of flour was to arrange them on their sides, one on the top of the other, in the form of a pyramid; second, that on the day of the accident a larger number of barrels than usual had been received, which had rendered it necessary to fill up the whole of the building to the walls.

The writer quickly made up his mind that the accident had occurred primarily in consequence of bad mortar being used in the construction of the brickwork; that the walls were strong enough to stand so long as the weight was placed directly upon them as a dead load as it was when the flour barrels were arranged in pyramidal form, but that as soon as they were packed up solidly, they exerted a side pressure on the walls and so sent the front wall, which had no support, into the street. The building referred to was situated just below the Brooklyn bridge, and it was plain enough how the vibration of the cars had caused the barrels to slip and to thrust out the wall.

Accidents, where the cause can be so readily ascertained, are, of course, rare; but it is doubtless a fact — and one of which the writer, personally, has no doubt whatever — that when brick buildings fall, the fault is due, in nine cases out of ten, to imperfect mortar. It should be remembered that there are no better bricks made in the world than in the United States; in fact, no other country approaches even nearly to the degree of perfection which the American manufacturer of bricks has reached. The same cannot, however, be said of brickwork, because both the bond and the mortar are often so defective.

Perhaps brickbuilders, as a rule, do not sufficiently realize the importance of using hydraulic lime or cement in mortar. Entirely too frequently pure lime that possesses no hydraulic qualities whatever, and is fit only for inside plastering, is used to the serious detriment of the strength of the building. The nomenclature of limes divides them up into two classes, — the pure or fatty limes, that consist of pure carbonate of lime and yield a quantity of steam and heat in slaking, and the poor, meagre, or hydraulic limes that have some silica, alumina, iron, and other foreign substances in their composition, and possess the property of setting under or in the presence of water. Pure limes dissolve more or less in water, and will not set in damp situations. The terms "poor" and "meagre" applied to hydraulic limes arise from the cold appearance they possess when mixed with water in contrast with "fat" limes that have a distinctly oily or unctuous look.

Now it will readily be seen that it is necessary that mortar, to be good, shall be made only from a lime possessing some not inconsiderable hydraulic properties. While limes are divided up into two classes as above stated, they range in degree all the way from one to the other; that is, there are limes that contain only a little hydraulic qualities which would be ranked in the general class of pure limes, and so on up to those that were distinctly hydraulic in composition. The important thing for the brickbuilder to remember is, that the greater hydraulic properties his lime possesses, other things being equal, the stronger will be the mortar. Cement is essentially hydraulic, and when a lime is used that lacks or is deficient in hydraulic qualities a proportion of cement should be added. In this case it is a good plan to mix the mortar in large quantities so as to give a chance for the lime to slack perfectly. A thorough admixture is very necessary, and it is for this reason that mortar-making machines are successful. The expression sometimes used by laborers making mortar of "drowning" it, when too much water is added, is a very expressive one; no more water should ever be used than is necessary to thoroughly wet the whole mass.

Of course sharp, clean sand or its equivalent is necessary. Sea sand may be used with hydraulic cement or lime if the wall is to be under water, as the salt is in that case no objection. There are several substitutes for sand; for instance, ground coke, slag, stones, or brick. Perhaps the best substitute is burnt clay ground to a sufficient fine ess. This makes a very strong mortar.

The impo tance of making mortar as strong as possible can be best understood when it is taken into consideration that there are other strains in an ordinary building than that of a direct crushing weight. Even good mortar is very weak when subjected to a tensile or pulling strain, and its greatest strength is in resisting a crushing load. In ordinary buildings the roof exerts an outward thrust on the walls, in many cases, while the joists, bending under the weight put upon them, have a tendency to some extent to pull the wall in. Then, again, the pressure of wind is considerable at times, and puts a tensile strain on the mortar that must be provided for. In short, the mortar used in the construction of a piece of brickwork is of a necessity the weakest part of the structure, and should be made as strong as it is possible to make it.

By using hoop-iron bond, as previously referred to in these columns, the function of the mortar in holding securely together the component parts of the wall is considerably added to. The use of this iron bond is increasing, and when some enterprising manufacturer comes forward to push it vigorously, it will doubtless be the exception where it is not used rather than the rule. Its advantages are too great, and its cost comparatively too low, to make it long in coming into general use.

ARTHUR SEYMOUR JENNINGS.

FIREPROOF AND DURABLE BRICKS AND MORTAR MADE FROM WASTE MATERIAL.

From the Journal of Commerce and Building Record, Texas.

In the first instance, it must be particularly and distinctly borne in mind that the writer does not hold himself responsible for any man's ignorance or prejudice against "home (Texas) manufacture."

Brogniart of France, Ure of England, and other scientists tell us that there are four classes of clays: first, fire clay; second, potters' plastic clay; third, effervescing clay; and fourth, ochre clay.

Effervescing clay is so named from the heavy presence of chalk, often interspersed with small pebbles or particles of rotten or decomposed lime, stone, carbonate of lime, and small shells.

These effervescing clays, which at present are cast aside as useless and worthless, for want of proper treatment in manufacture, are perhaps the most useful, if not the most valuable, for the manufacture of indestructible hydraulic and perfectly fireproof city building material. They were the clays of the Romans and other more ancient nations; of these they made their indestructible bricks and built their indestructible cities, indestructible wagon roads and pavements.

The nations of the past that lived in the channels of the ancient Nile, Mexican America, and elsewhere, whose people and races are not even known in the pages of the most ancient history, all had their bricks, their vases, and their human figures in well-burnt, hard "effervescing clay."

Granite disintegrates and crumbles into particles of mica, quartz, and feldspar; marble moulders into dust of carbonate of lime; but well-burnt, hard effervescing clay bricks endure forever, as the ancient landmarks of mankind unquestionably prove.

Effervescing clay bricks, by proper treatment in manufacture, when ground into fine powder, produce "Roman cement" of the very highest order and quality. These bricks, when set or built in their own cement, produce one solid mass of indestructible, hydraulic, and perfect fireproof rock building from foundation to roof, constantly increasing in strength, beauty, and value with age and with change of temperature, constituting the old Roman indestructible city building material; and the old Roman solid hydraulic rock wagon roads, better, harder, and more indestructible to-day than the day they were built, in the days of Julius Cæsar. It is a well-known fact, beyond all doubt and argument, that the foundations of important Roman and other ancient buildings are all built of effervescing clay bricks, set in their own cement or mortar.

The foundation of the great St. Paul's of London, built by Sir Christopher Wren, is built of these clay bricks, set or built in good Roman cement mortar. The character and tenacity of these bricks are such it is said that, by proper treatment in manufacture, they will stand the high pitch of cast iron melting and the most sudden heating and cooling without cracking or falling to pieces.

Here, on the great Mounts Barker and Bonnel, adjacent to the city of Austin, these valuable effervescing clays exist in hills from three to four hundred feet high and fathoms deep; close to railway transportation, for shipment to all parts of Texas and the South; never-failing water, the Colorado River, with millions upon millions of the very best wood, cedar, and hard oaks for fuel; in one of the most beautiful and healthy climates in the world, barring none.

When our beautiful "Dam" is finished, we shall require millions upon millions of these beautiful effervescing clay bricks, and many tons of Roman and Portland cements, for the city will extend, and in the expansion the best and safest material will unquestionably be used and the effervescing clay will be selected; nor is this all, as its merits become known, its popularity will extend.

I will take pleasure in entering into a more full and minute explanation relative to these clays, their uses and proper treatment.

J. Dimelow.

Laboratory of the State of Texas and the South,
Mount Barker, near Austin, Texas, June 24, 1892.

MORTAR.

The cohesive and adhesive strength of mortar in waterbound brickwork, says the *Building News* in an article on the subject, is due not to its peculiar hardness, for that is a quality which it cannot be said to largely possess, but is due rather to its *elasticity;* for it is frequently found when cutting away or removing portions of this kind of work that a stout chisel may, without experiencing much resistive force, be driven into the mortar joints without any apparent effect beyond that of displacing so much of the mortar as previously occupied the space taken up by the chisel; the largest portion of the displaced mortar being driven into a closer molecular proximity than previously existed. The ancient Romans, who seem to have done all things well, are accredited with the practice, in the preparation of their mortars, of forming pits and burying the newly made mortars for a considerable time before using them; a statement sometimes adduced (and not unreasonably so) to account for the strength and durability of their work. In criticising the remains of old work, it is well to remember that in that, as in all things, we have the survival of the fittest; that the bad work of the ancients (if they did any) is gone, like Prospero's "insubstantial pageant faded," leaving "not a rack behind," and we are left only with the good from which to draw our inference of the whole.

Such a process of mortar-making, however desirable, cannot in these go-ahead days of heavy city ground rents and suburban building of mushroom growth be now indulged in. But the really practical man is often astonished to find in specifications emanating from high places the following words: "No more mortar to be made up at one time than is necessary for the day's consumption." This is a necessary provision when building in the winter season, and it is necessary to provide at other seasons that the mortar shall not lie about in thin isolated beds or layers until all moisture is extracted from it. But it is desirable under all other circumstances that it be allowed to lie sufficiently long to admit of the unequally burnt parts of lime taking in sufficient moisture to make them soluble, as lime that is not well burnt imbibes water very tardily.

When this is not done these parts will slake in the brickwork, forcing out portions of joints in their immediate vicinity, and raising considerable portions of the overlying brickwork off its beds. Such under-burnt parts of lime are, when slaked, distinguishable by a dark bluish-gray color, and if exposed sufficiently long to the air will resolve themselves into a fine powder.

The lines in general use in and about London are the Dorking, the Merstham and Halling, and are known as gray or stone lime. These limes are used for the first and second coats of the plasterer — viz., the rendering and floating coats — as they acquire in setting a hardness which the chalk or pure limes never attain, the chalk lime being suitable only for the third or finishing coat, known technically as "setting," and which acquires its hardness by the process of trowelling to which it is subjected by the plasterer when mixed with about one third of fine washed sand, or are otherwise gauged with plaster of Paris.

Well-burnt graystone limes imbibe water greedily, slake freely and quickly if supplied with sufficient water, while the eminently hydraulic limes imbibe water less freely, and slake very tardily, and for this reason blue lias lime, when in the lump, should be covered over with sand for two or three days, and copiously supplied with water, before putting it in the mortar-pan, the wet sand retaining some of the water applied and to some extent preventing the escape of the heat generated in the incipient stage of the slaking process, which two factors combined are generally considered to accelerate the slaking.

The advantage claimed for mortar that has been made up sufficiently long to allow it to properly cool is that the outer skin of the mortar heap becomes sufficiently hard by the process of surface evaporation and the attraction of atmospheric carbon to imprison within the bulk sufficient moisture to slake the badly burnt portions of lime, in the shape of "core," that may be in the mortar, to set up in its incipient stage the chemical action which we are told takes place between *silex* or sand-grains and dissolved lime, coating the individual grains or *nuclei*, and filling up the microscopic spaces which must exist between all angular grains, however small they may be.

By a proper process of retempering the mortar, the particles are driven closer together, the excess water is eliminated, and the mortar acquires a characteristic known to workmen practised in the use of mortar by the name of *toughness*, in which state it can be used with infinitely less liability to shrinkage than a newly made mortar.

Walls built with tempered mortar and bricks sufficiently wetted — that is, wetted to a degree short of absolute saturation, a degree which can be better determined by the practical workman than prescribed here — produces the best results. By all means avoid the use of super-saturated bricks.

It not infrequently happens that a bad mortar is produced from good material, and the one chief thing productive of this is the modern mortar-pan, coupled with the impractical idea of many of our so-called builders of to-day (largely — very largely — recruited from the ranks of builders' clerks, with a knowledge of building commensurate to the making out a list of items under the head £ s. d., and circumscribed by the four edges of a sheet of foolscap) that any unskilled workman (*i. e.*, unskilled in that particular branch) can turn out a bed of bricklayers' mortar. This work, more often than not, is assigned to the engine-driver, who does the double duty of engine-driver and mortar-pan attendant. If he be a competent driver, the chances are that he knows little, and cares less, about mortar; and years of practical experience in the supervision of work have taught the writer that the mortar is turned out of the pan either imperfectly incorporated, or, what is more frequently the case, is overground to such a degree as to be little better than mere dust when dry, the grit and body of the sand being ground out of it.

The objection to loam in sand is that it deteriorates the setting and indurating properties of the lime, coating the sand grains and forming a separating medium between them and the lime, to the injury of the tensile and cohesive strength of the resulting mortar. Mortars made of unclean or loamy sand are very liable to shrinkage and cracks. The use of water impregnated with loam or clay should be avoided, both in slaking the lime and in retempering the mortar.

BRICKS AND BRICKWORK.

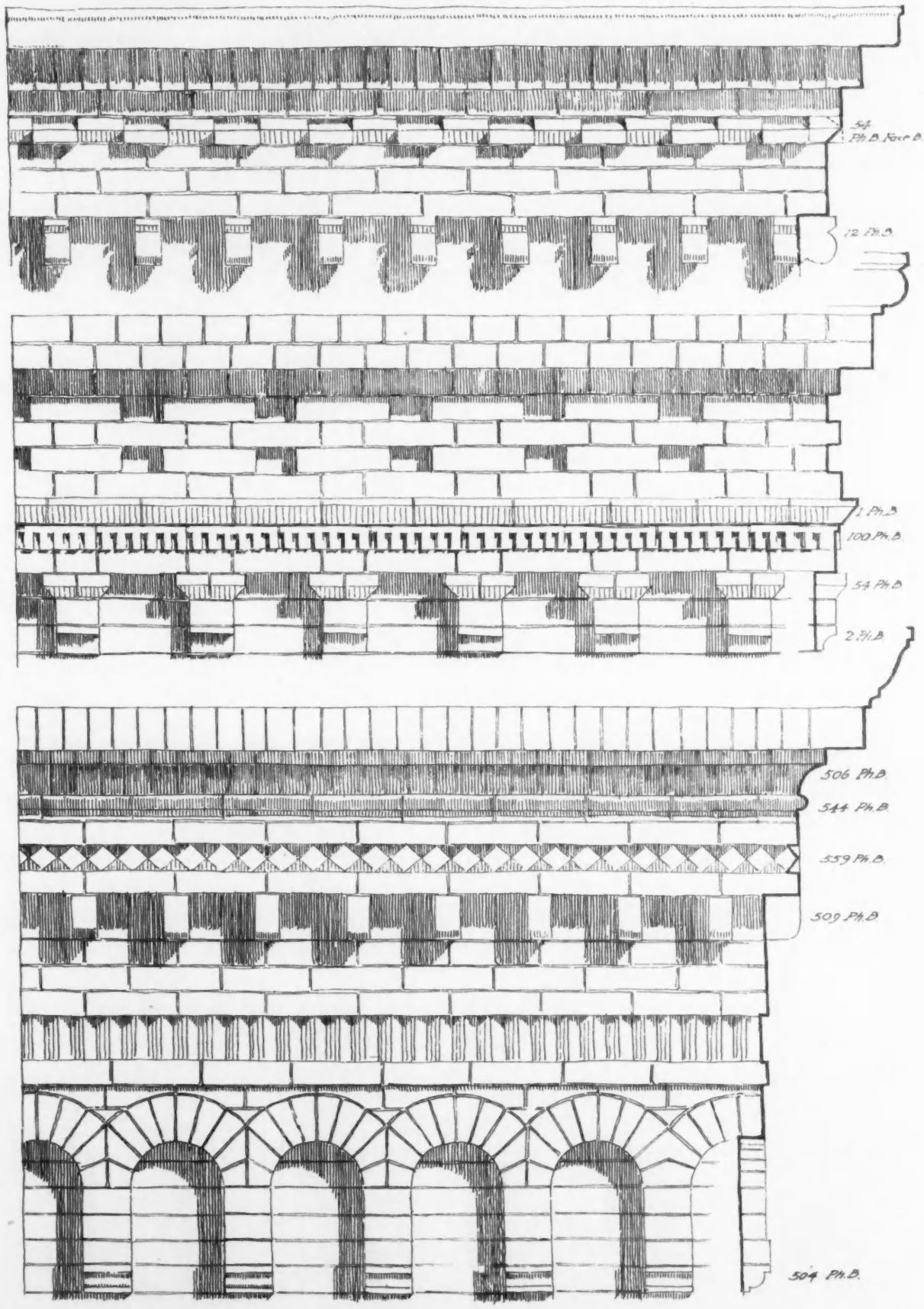
A Lecture delivered at Carpenter's Hall, London, by Prof. T. Roger Smith, F. R. I. B. A.

(*Concluded.*)

Against each of these good qualities, however, we may set a corresponding defect. If brickwork is easily thrown into any shape, it is also thrown easily out of shape. It has little coherence or stability, less than masonry, and very considerable less than timber. If any unequal settlement in the foundation of a brick building occurs, those long zigzag cracks, with which we in London are only too familiar, set themselves up at once, and if any undue load or any variation in load exists, the brickwork begins to bulge. Any serious shock may cause a building of ordinary brickwork to collapse altogether, and from time to time a formidable accident occurs owing to this cause. The fact is, the bricks are each so small compared to the mass of the work, and the tenacity or hold upon them of even fairly good lime mortar is so comparatively slight, that there is really but little grip of one put

CERTOSA, AT PAVIA.

Fifth of a Series of Photographs of Foreign Brickwork.



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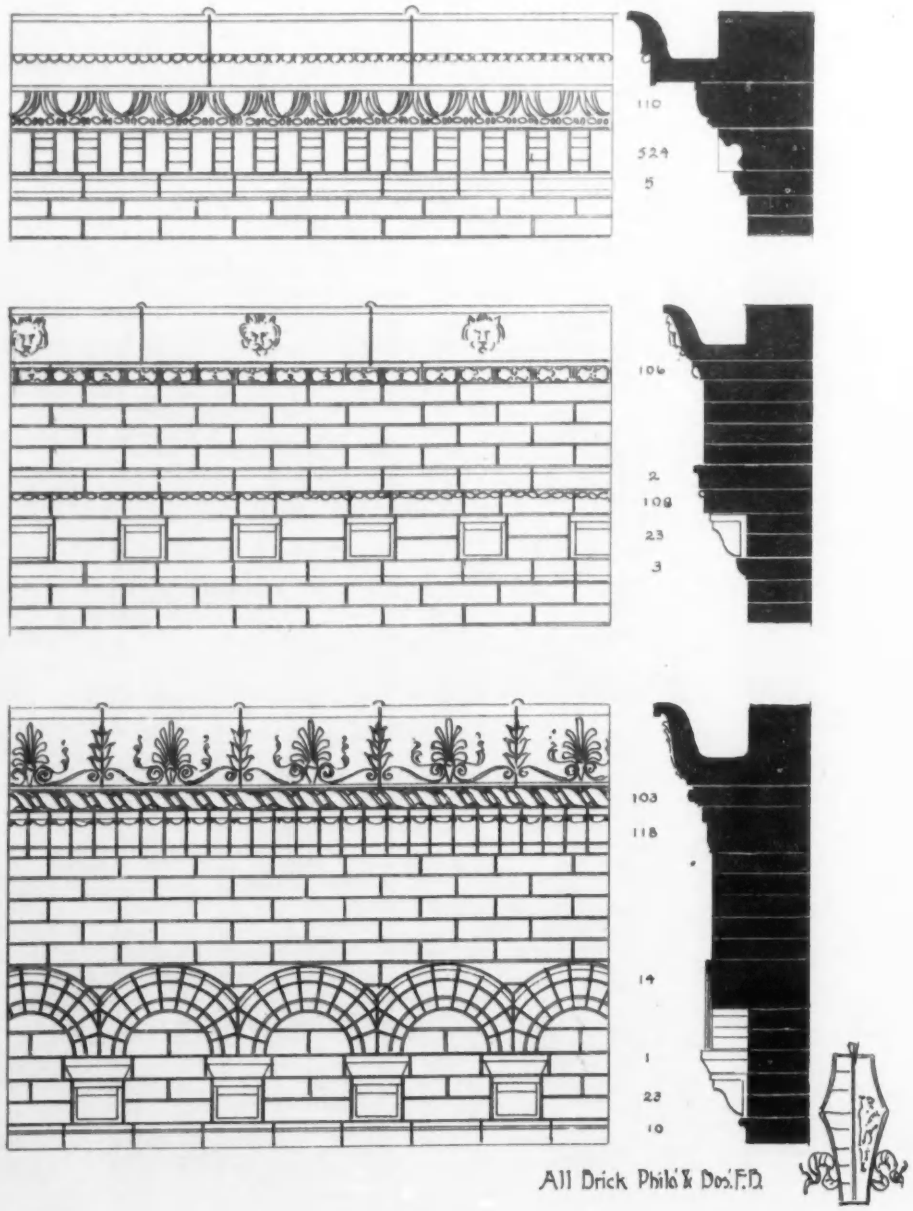

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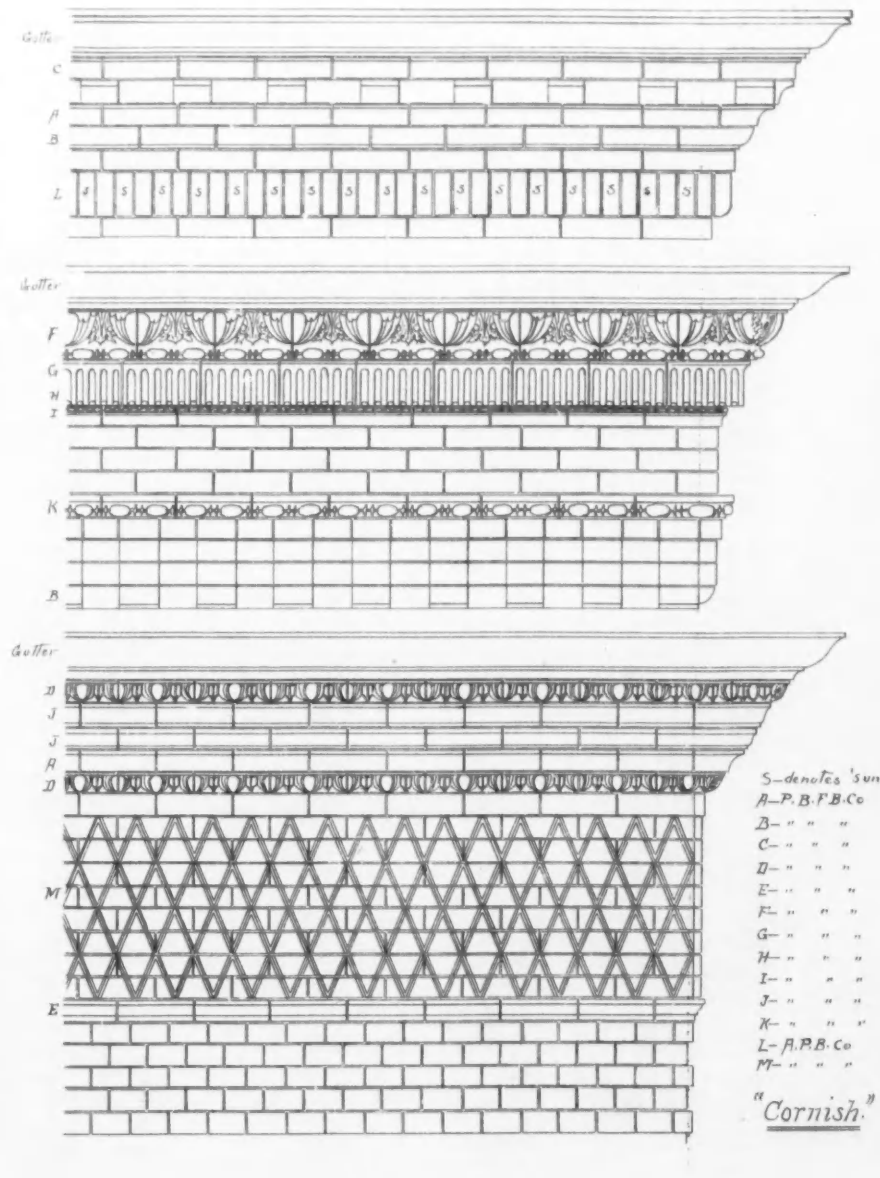

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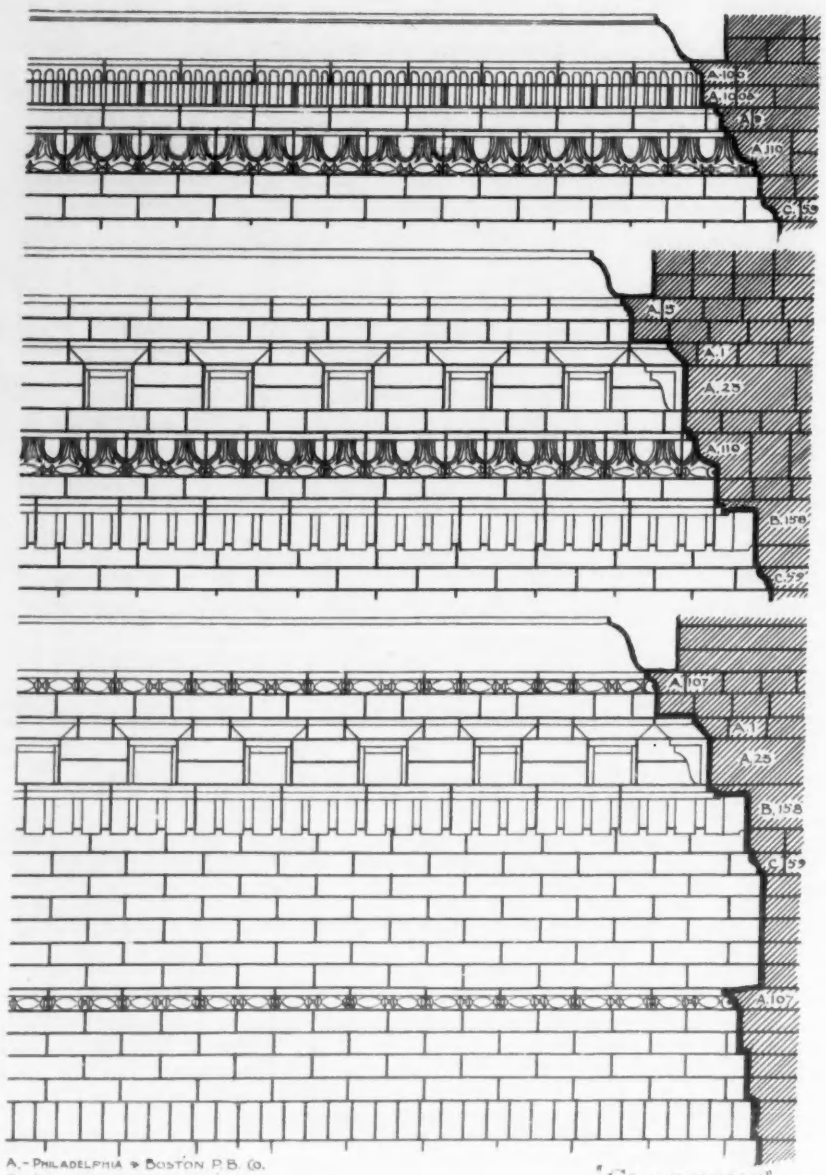

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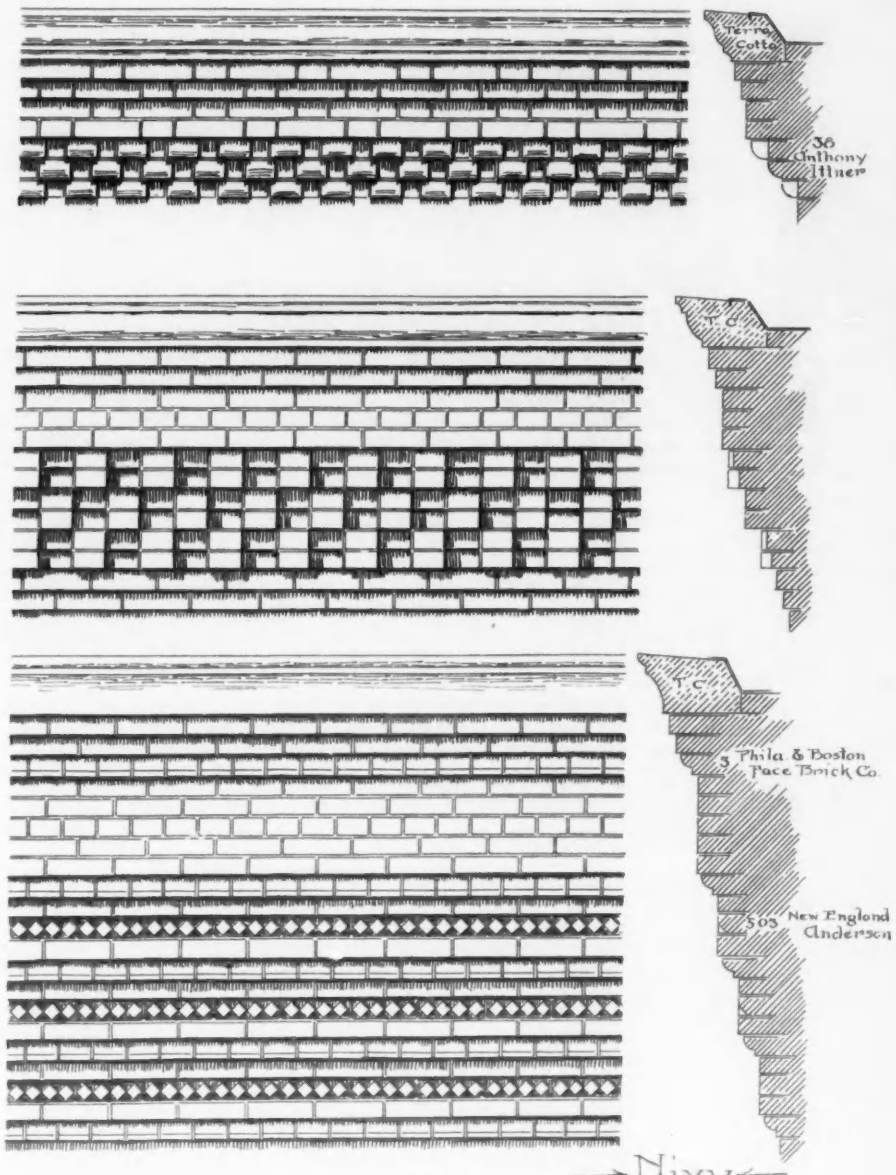

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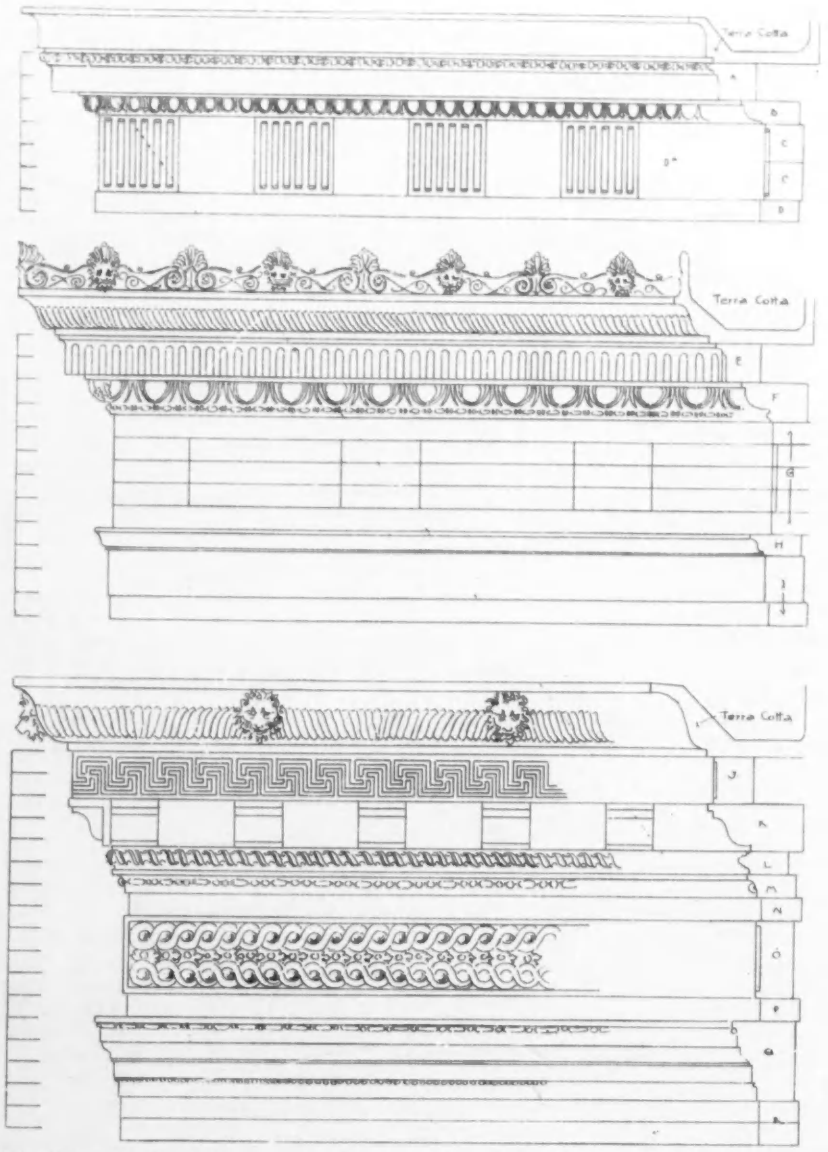

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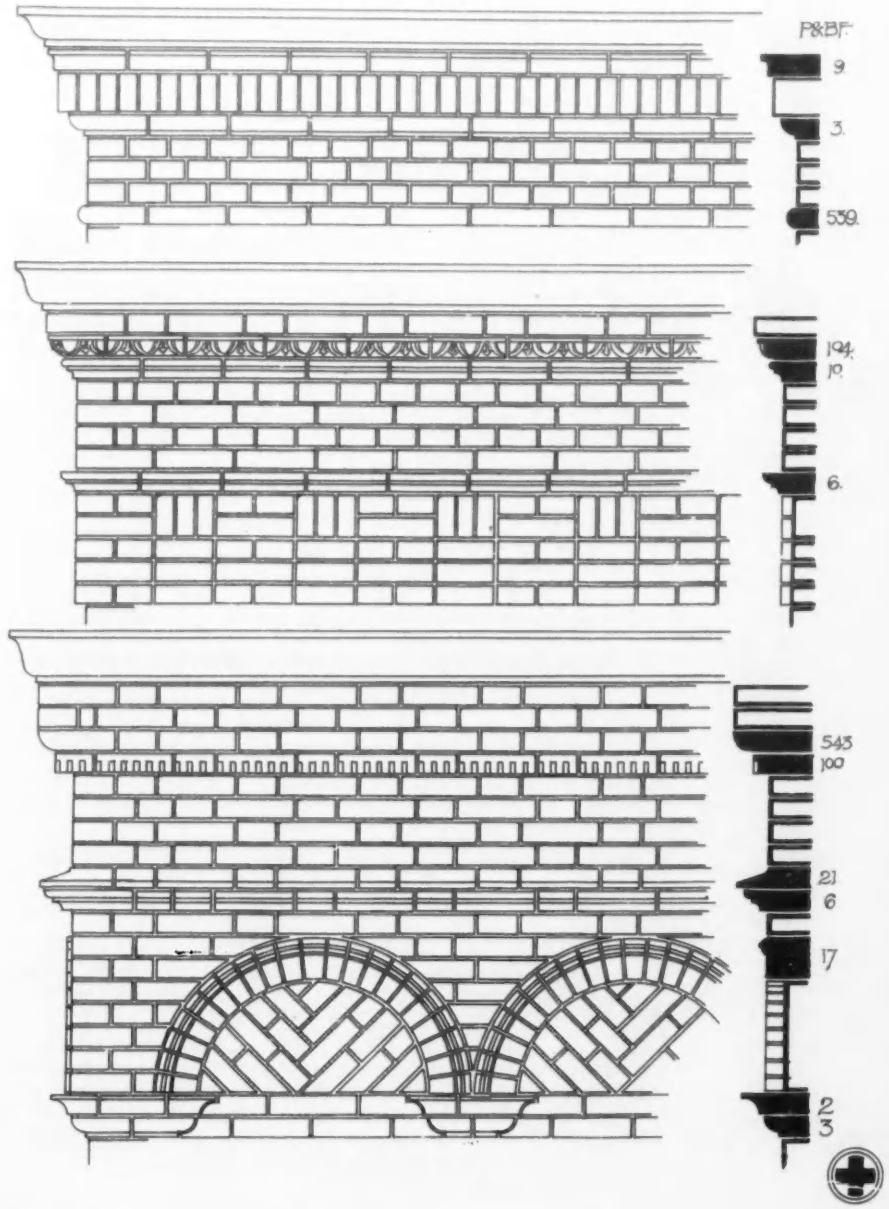

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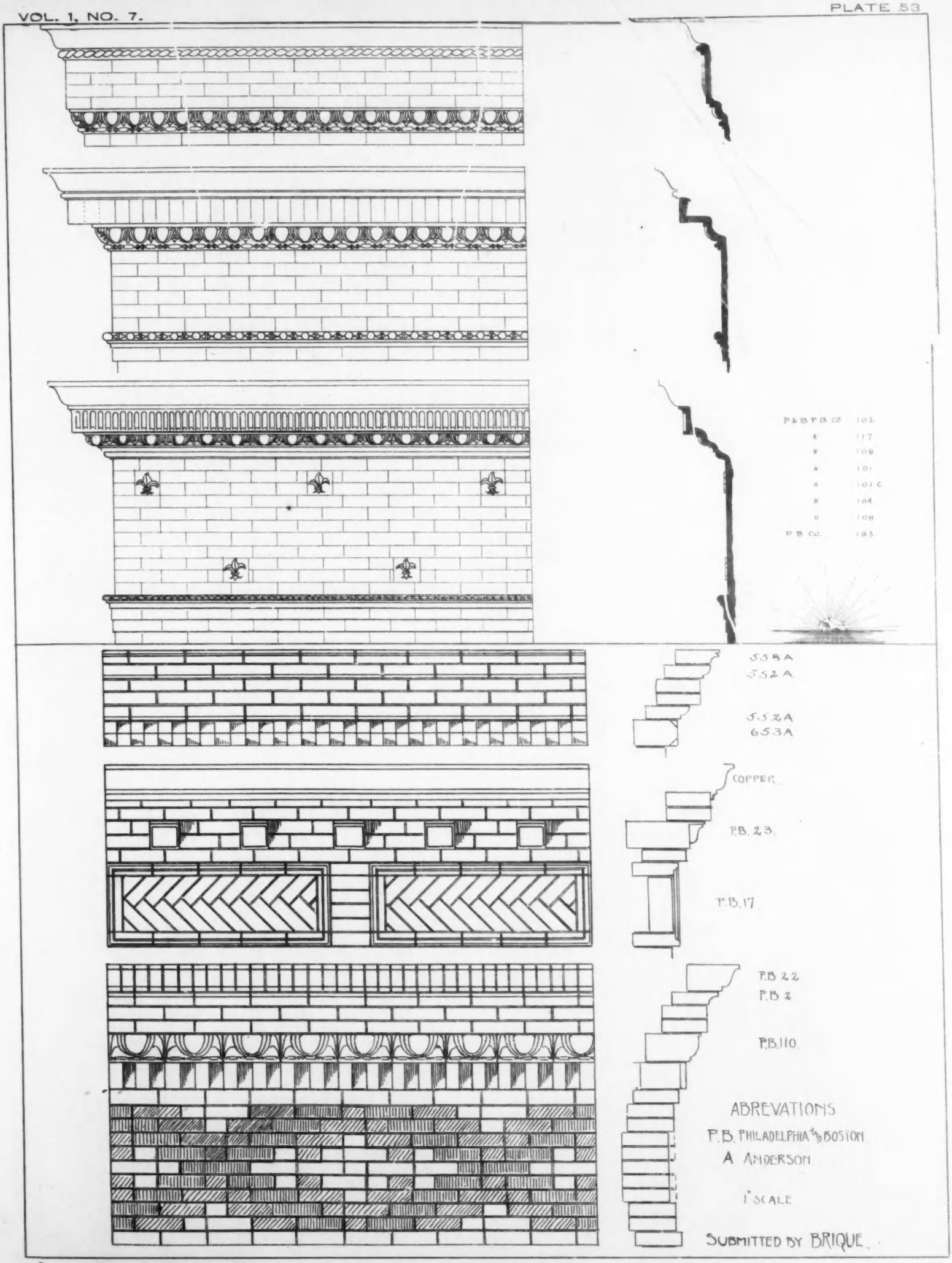

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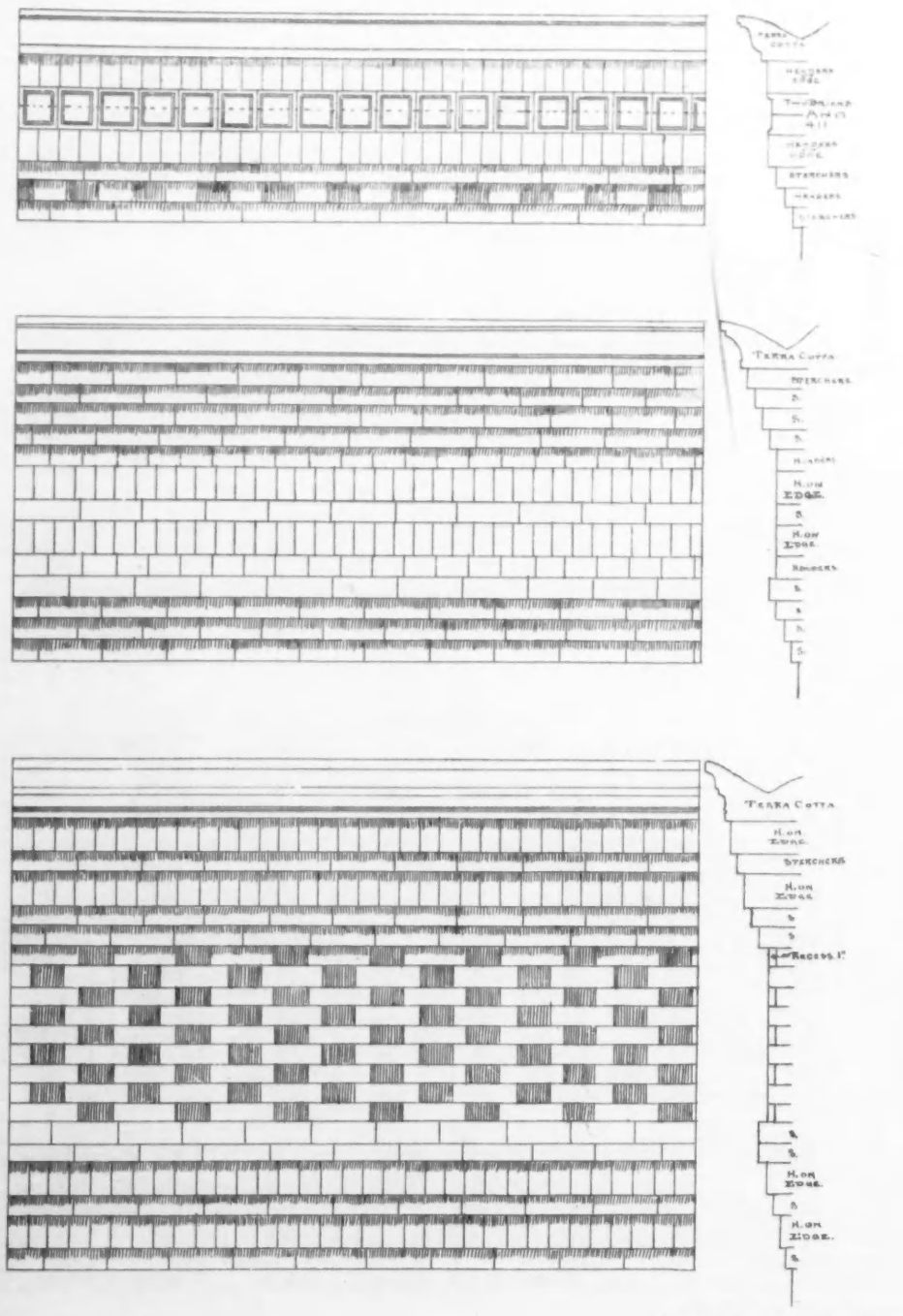

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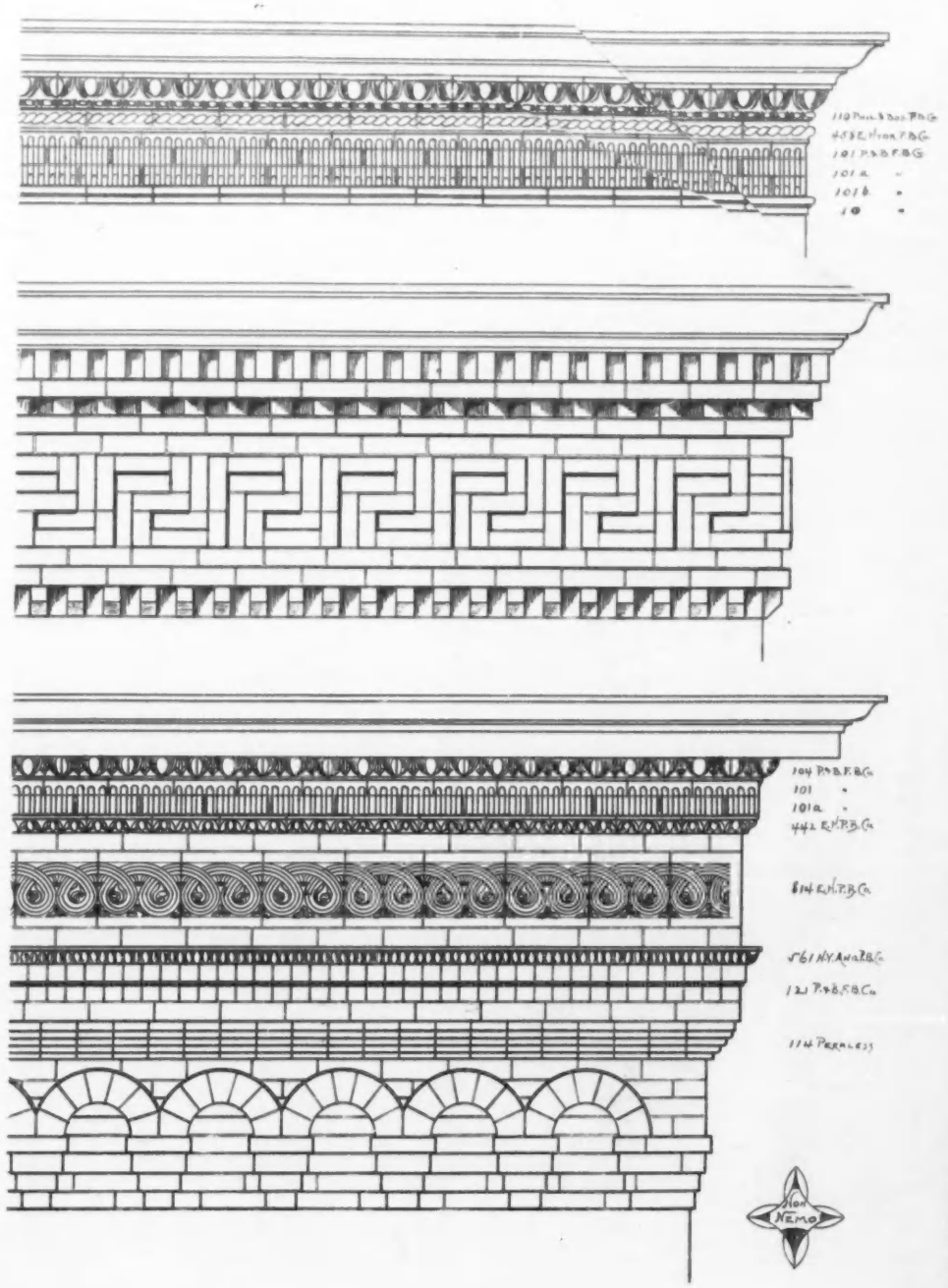

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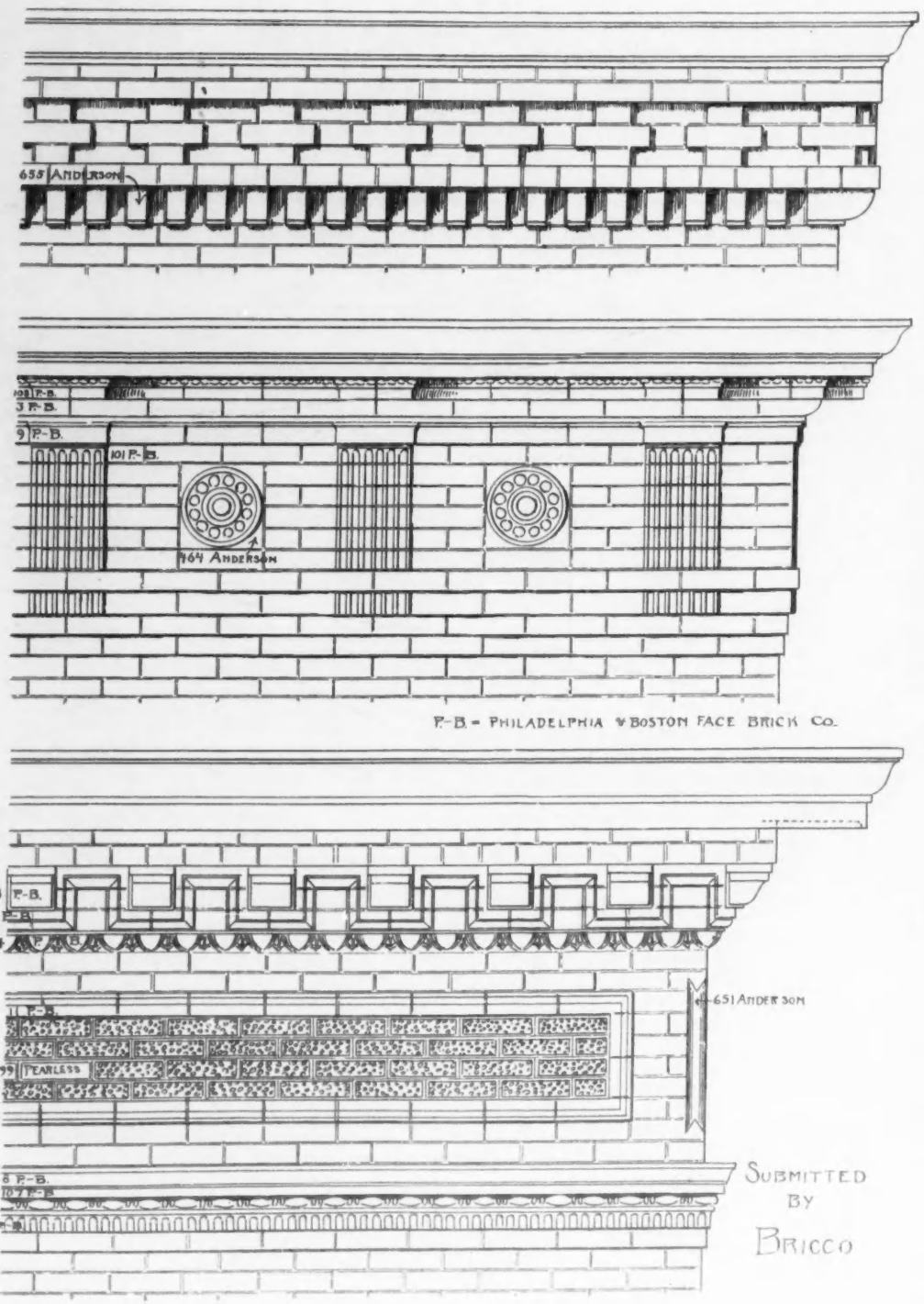

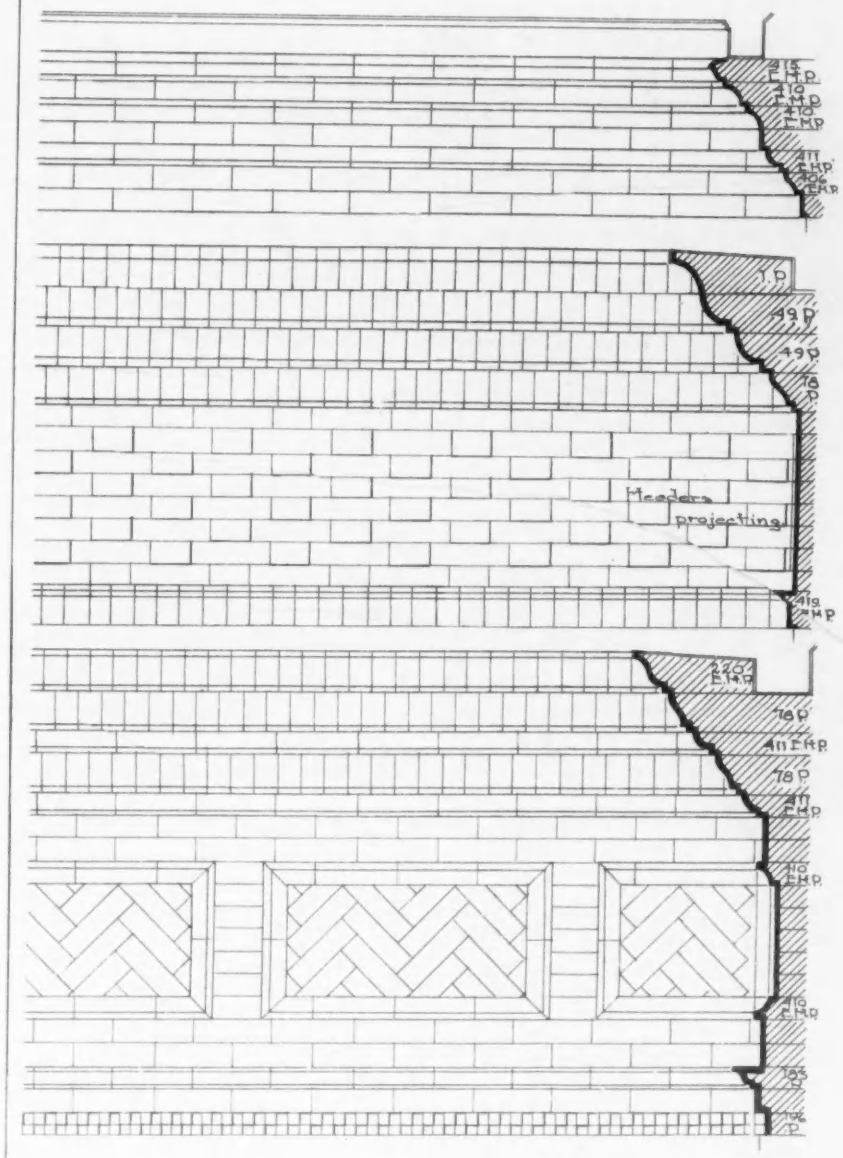

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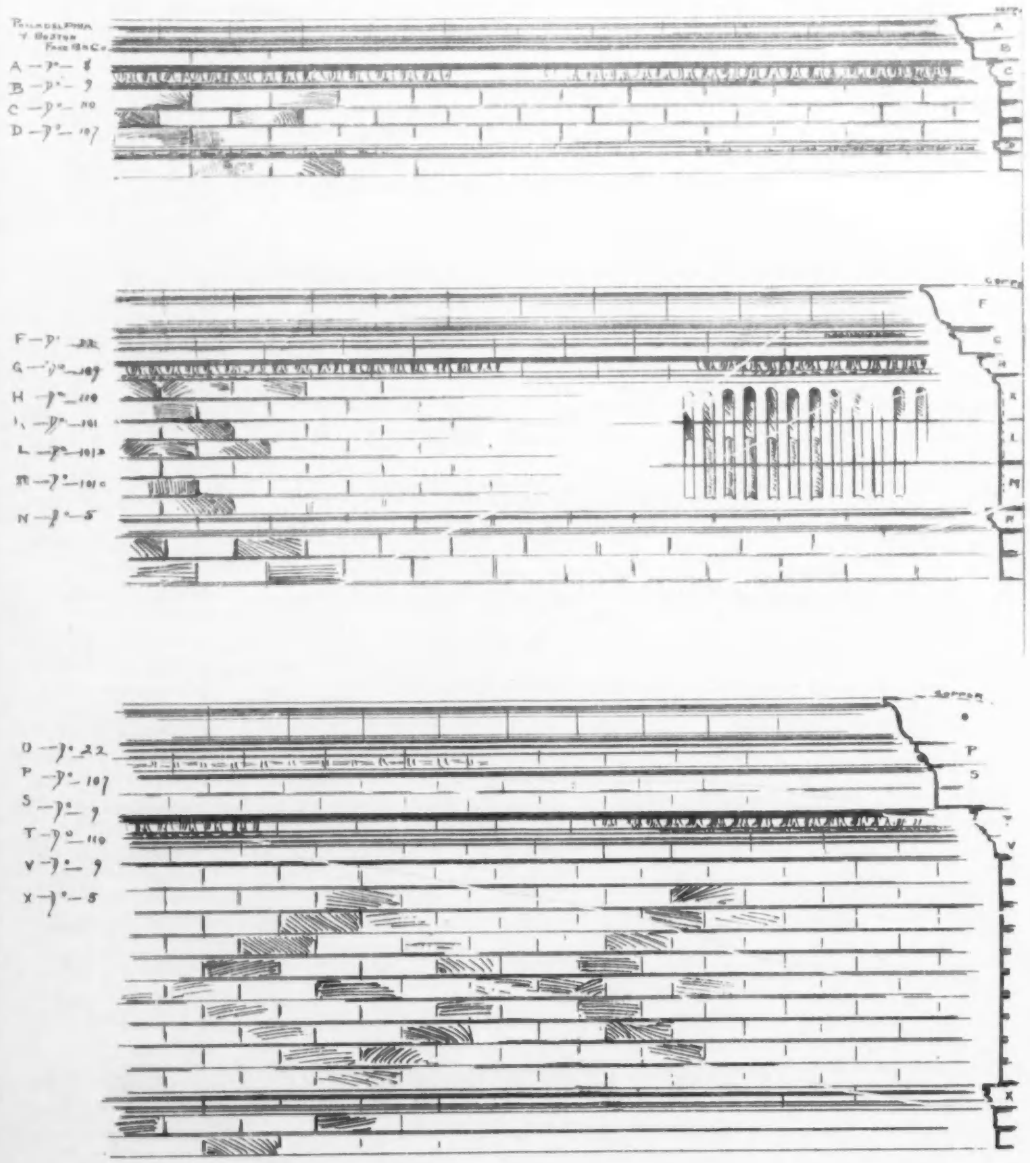

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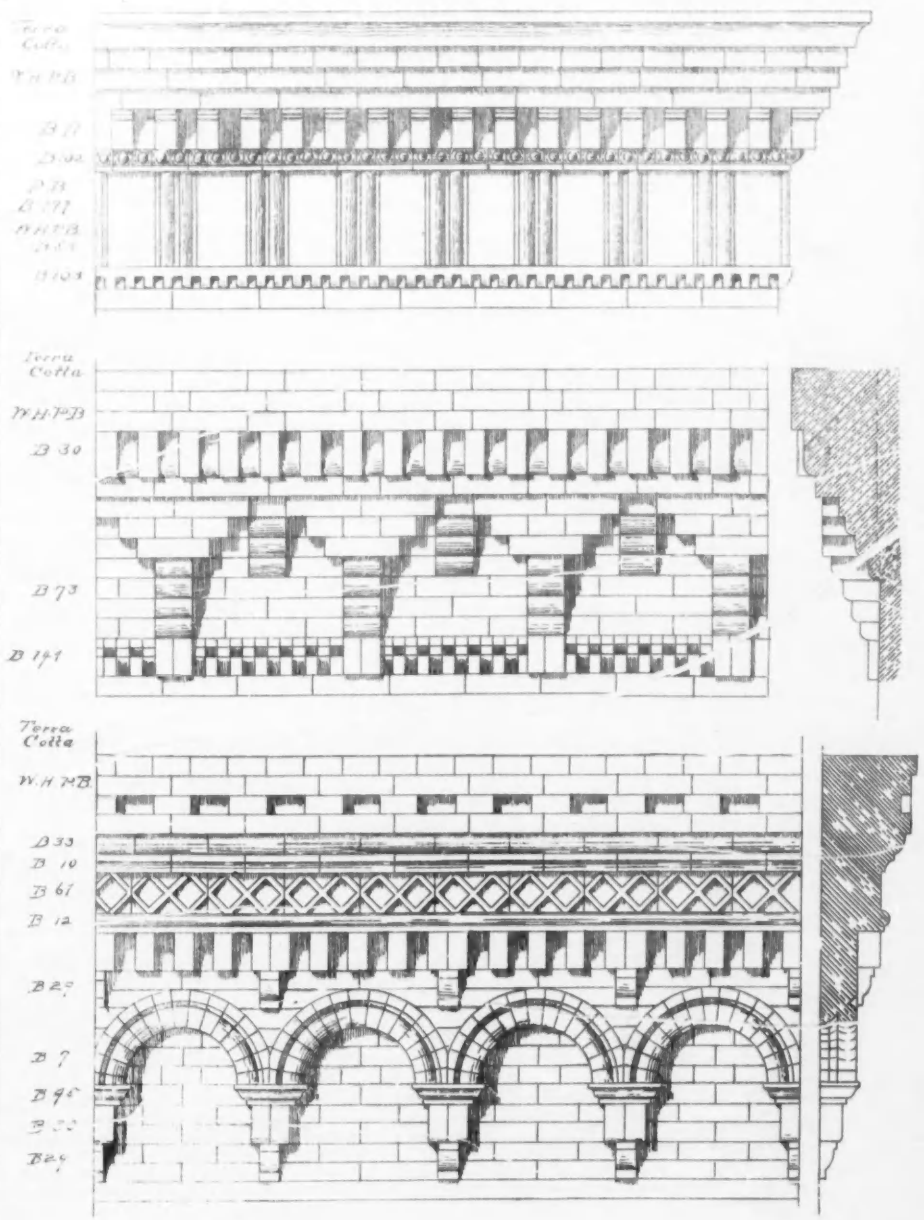

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OUT OF THE COMPETITION.

upon another. Persons who have to design and construct brick buildings should never forget that they have to be handled with caution and are really very ticklish and unstable.

One or two of the methods of overcoming this to some extent may be mentioned.

The first is the introduction of what is called bond. At the end of the last century it was usual to build in, at every few feet in height, bond timbers, which were embedded in the heart of the walls. If these had always remained indestructible, they would no doubt have served their purpose to some extent. Unfortunately, timber both rots and burns, and this bond timber has brought down many a wall owing to its being destroyed by fire, and has in other cases decayed away, and caused cracks, settlements, and failures.

The more modern method of introducing a strong horizontal tie is to build into the wall a group of bands of thin iron, such as some sorts of barrels are hooped with, hence called hoop-iron. The courses of bricks where this occurs must be laid in cement, because iron in contact with cement does not perish as it does in contact with mortar. If in every story of a building four or five courses are thus laid and fortified, a great deal of strength is given to the structure.

Another method which has rather fallen into disuse is grouting. This is pouring liquid mortar, about the consistency of gruel, upon the work at about every fourth course. The result is to fill up all interstices and cavities, and to delay the drying of the mortar, and brickwork so treated sets extremely hard. I have seen a wall that has been so treated cut into, and it was quite as easy to cut the bricks (sound ones though they were) as the mortar joints.

Grouting is objected to because it interferes with the good look of the work, as it is very difficult to prevent streaks of it from running down the face, and it is apt to delay the work, but it is a valuable means of obtaining strong brickwork.

Another and more popular method is to build the work in cement, now usually Portland cement. This, of course, makes very strong, sound work, and does not involve any delay or dirt like grouting, or the introduction of any fresh material like hoop-iron; but it, of course, adds to the expense of the work considerably, as cement is much more costly than lime. I ought to add that the advocates of Scott's selenitic mortar claim that it not only sets quickly and hard, but that it is extremely tenacious and consequently makes a much more robust wall than ordinary mortar. I dare say this is true, but I have not happened to see such a wall cut into, and this is the best test of solidity.

The second deficiency in brickwork which I am bound to notice is that, though it is very fireproof, it is far from being waterproof. In an exposed situation, rain will drive completely through a tolerably stout brick wall. If water be allowed to drop or fall against it, the wall will become saturated like a sponge. If the foot of a wall becomes wet, or if the earth resting against the lower parts of it be moist, water will, if not checked, rise to a great height in it, and if the upper part of the wall be wet, the water will sink downwards. With most sorts of brick the outer face absorbs moisture whenever the weather is moist, and in time the action of the rain, and the subsequent action of frost upon the moisture so taken up, destroy the mortar in the joints, which are to be seen perfectly open as if they had been raked out. In old brickwork, and in some cases (happily not in many), the action of weather destroys the bricks themselves, the face decaying away and the brick becoming soft.

Against this serious defect in our staple building material a series of precautions has been devised. Damp, rising from the foot of the wall or from earth lying round its base, is combated by a damp-course, — a bed of some impervious material going through the wall.

Damp earth may be kept off by surrounding the walls with an open area or a closed one, usually termed a dry area. Damp against the face of the walls may be partly combated by a careful selection of a non-absorbent brick with a hard face, and by struck joints; but it is most effectually kept at bay by the expedient of building the wall hollow, that is to say, making the external wall of the house to consist of two perfectly distinct walls, standing about two inches apart, and held together by ties of earthenware or iron. The result is that the moisture blowing through the outer skin does not pass the cavity, but trickles down on the inner face of the outer wall, while the inner wall remains dry.

The ties are constructed of shapes to prevent their conducting water themselves from without to the inner wall.

In addition to this, a series of slates forming an intermediate protection is sometimes introduced, and forms an additional and most valuable screen against weather. Sometimes the two skins of the wall are closer together — say three fourths inch — and the space is filled with a bituminous material. A substance of a bituminous nature, called hygeran rock, has been of late years introduced, and is being extensively used for this purpose; it is melted and poured into the open space hot, and quickly hardens. The use of such a material is open to the objection that no air can pass through it. The rooms of our houses are receiving air constantly through the walls, and much of the constant current up our chimneys is supplied, to our great advantage, in this very imperceptible manner. The house breathes, so to speak, through the pores of its brickwork. When this is rendered impossible, it seems clear that fiercer draughts will enter through the chinks and crevices, and that there will be a greater demand upon flues not in use, occasioning down draught in the chimneys.

Another mode of keeping out weather is to cement the face of the brickwork, but this hides up the work and so tends to promote bad work, besides being often very unsightly.

Among other peculiarities of brickwork are the facilities for introducing different colors and different textures of surface which it presents, the ease with which openings and arches can be formed in it, the possibility of executing ornament and even carving, and the ease with which brickwork will combine with other building materials. It cannot be well made use of for columns, though it may readily enough be turned into piers or pilasters. It cannot, generally speaking, with advantage be made use of for any large domes, though the inner dome of St. Paul's and the intermediate cone are of brick and stand well; but it is an excellent material for vaulting arcades, and all purposes involving the turning of arches.

Brickwork must be said to be durable, but it requires care. If not of the best, brickwork within the reach of the constant vibration caused by the traffic on a railroad seems to be in danger of being shaken to pieces, judging from one or two instances that have come under my own observation. The mortar, and even in some cases the bricks themselves, will rapidly deteriorate if moisture be allowed to get into the heart of a brick wall, and in exposed situations this is very apt to happen.

Care should always be taken to keep the pointing of external brickwork in good order, and to maintain all copings and other projections intended to bar the access of water coming down from above, and to stop the overflowing of gutters and slack pipes, which soon soaks the wall through and through.

Of course, if there is a failure of foundations, brickwork, as was pointed out earlier, becomes affected at once; but if these be good, and the materials used be sound ones, and if the other precautions just recommended be taken, it will last strong and sturdy for an immense length of time. In some cases, as, for example, in the Roman ruins, it has stood for fifteen hundred years under every possible exposure and neglect, and still shows something of a sturdy existence after all, though sadly mutilated.

If we now return to the question, what can be well done in brickwork, no better answer can be given than to point to what has been and is being done, especially in London and within our own reach and observation. Great engineering works, such as railway viaducts, the lining of railway tunnels, the piers and even the arches of bridges, sewage works, dock and wharf walls, furnace chimneys, and other works of this sort are chiefly done in brickwork, and notwithstanding that iron is far more used by the engineer for some purposes and concrete for others now than formerly, still there is a great field for brickwork.

The late Mr. Brunel, who was fond of pushing size to extremes, tried how wide a span he could arch over with brickwork, and I believe the bridge which carries the G. W. R. over the Thames at Maidenhead has the widest arch he or any other engineer has successfully erected in brick. This arch has, it is stated, a span of 128 feet. It is segmental, the radius being 169 feet, and the rise from springing to crown 24 feet, and the depth of the arch 5 feet 3 inches.

Nowadays, of course, no one would dream of anything but an iron girder bridge in such a position. Mr. Brunel's father, when he constructed the Thames Tunnel, lined it with brickwork foot by foot as he went on, and that lining sustained the heavy weight of the bed of the river and the river itself.

OUT OF THE COMPETITION.
HONORABLE MENTION.

If you leave London by either of the southern lines, all of which are at a high level, you go for miles on viaducts consisting of brick arches carried on brick walls. If you leave by the northern lines, you plunge into tunnel after tunnel lined with brickwork, and kept secure by such lining. Mile after mile of London streets and those in the suburbs present to the eye little but brick buildings. Dwelling-houses, shops, warehouses, succeed one another, all in brickwork, and even when the eye seems to catch a change it is more apparent than real. The white mansions of Tyburnia, Belgravia, South Kensington, and the neat villas of the suburbs are only brickwork, with a thin coat of stucco, which serves the purpose of concealing the real structure — often only too much in need of concealment — with a material supposed to be a little more sightly, and certainly capable of keeping the weather out rather more effectually than common brickwork would. More than this, such fine structures, apparently built entirely of stone, as are being put up for commercial purposes in the streets of the city, and for public purposes throughout London, are all of them nothing more than brick fabrics with a facing of masonry. Examine one of them in progress and you will find the foundations and vaults of brickwork, and not only the interior walls, but the main part of the front wall, executed in brickwork, and the stone only skin deep.

There are, however, two or three ways of making use of brickwork without covering it up, and of gaining good architectural effects thereby, and to these I beg now to direct your attention.

The architect who desires to make an effective brick building, which shall honestly proclaim to all the world that it is of brick, may do this and, if he will, may do it successfully by employing brickwork and no other material, but making the best use of the opportunities which it affords, or he may erect his building of brickwork and stone combined, or of brickwork and terra-cotta.

Mr. Robson, till lately the architect to the School Board of London, has the merit of having put down in every part of the metropolis a series of well-contrived and well-designed buildings, the exterior of which, almost without exception, consists of brickwork only. If you examine one of his schoolhouses you will see that the walls are of ordinary stock brickwork, but usually brightened up by a little red brick at each angle, and surmounted by well-contrasted gables, and with lofty, well-designed chimneys rising from the tiled roof. The window openings and doorways are marked by brickwork, usually also red and sometimes moulded, and though I personally must differ from the taste which selected some of the forms employed (they are those in use in this country in the seventeenth and the last centuries), I cordially recognize that with very simple and inexpensive means exceedingly good, appropriate, and effective buildings have been designed.

Among examples of architecture wholly or almost wholly executed in red brick, I cannot pass over a building built many years ago, little known on account of its obscure situation, but a gem in its way. I allude to the schools designed by Mr. Wilde, and built in Castle Street, Endell Street. Of buildings where a small amount of stone is introduced into brickwork we have a good many fine specimens in London. One of the best — probably the best — is the library in Lincoln's Inn Fields. This is a large and picturesque pile, built under Mr. Hardwick as architect, in red brick, with patterns in the blank parts of the walls done in black brick. It has splendid moulded brick chimneys, and the mullions of the windows, the copings, the entrances, and some other architectural features done in stone. The building is a good reproduction of the style of building in Tudor times, when, as has been already mentioned, brickwork was taken into favor.

Another building of the same class, but not so good, is the older part of the Consumption Hospital at Brompton. Brickwork, with a little stone, has been very successfuly employed as the material for churches, and in many such cases the interior is unplastered brickwork. Such churches often attain, when designed by skilful hands, great dignity and breadth of effect. St. Alban's, Holborn; the great church designed by Mr. Butterfield in Margaret Street; Mr. Street's church near Vincent Square, Westminster; and several churches of Mr. Brooks', such as he was kind enough to enable me to illustrate to-night, may be mentioned as examples of the sort.

Mr. Waterhouse has built an elaborate Congregational church at Hampstead which shows the use with which such effects of color may be obtained in interiors, and has kindly lent some drawings. Mr. Pearson's church at Kilburn may also be referred to as a fine example of brick vaulting.

Brick and terra-cotta seem to have a natural affinity for one another. Terra-cotta is no more than a refined brick, made of the same sort of material, only in every respect more carefully, and kiln baked. Its similarity to brick is such that there is no sense of incongruity if moulded or carved brickwork and terra-cotta are both employed in the same building, and this can hardly be said to be the case if the attempt is made to combine ornamental brickwork and stone ornaments.

At South Kensington a whole group of examples of brickwork with terra-cotta meet us. The Natural History Museum, the finest of them all, is hardly fit for our present purpose, as it is as completely encased in terra-cotta as the fronts of the buildings in this avenue are in stone. But here are the Albert Hall, a fine specimen of mass and effect, the City and Guilds Institute, the College of Music, and some private houses and blocks of flats, all in red brick with terra-cotta, and all showing the happy manner in which the two materials can be blended. In most of them there is a contrast of color; but Mr. Waterhouse, in the Technical Institute, has employed red terra-cotta with red bricks, as he has also done in his fine St. Paul's School at Hammersmith, and Mr. Norman Shaw has, in his fine pile of buildings in St. James's Street. This combination — namely, brick and terra-cotta — I look upon as the best for withstanding the London climate and for making full use of the capabilities of brickwork that can be employed, and I have no doubt that in the future it will be frequently resorted to. Some of these examples also show the introduction of cast ornaments, and others the employment of carving as means of enriching the surface of brick walls with excellent effect.

Here we must leave the subject, but in closing I cannot forbear pointing to the art of the bricklayer as a fine example of what may be accomplished by steady perseverance. Every brick in the miles of viaducts or tunnels, houses or public buildings, to which we have made allusion, was laid separately, and it is only steady perseverance, brick after brick, on the part of the bricklayer, which could have raised these great masses of work. Let me add that no one brick out of the many laid is of no importance. Some time ago a great fire occurred in a public asylum, and about £2,000 of damage was done, and the lives of many of the inmates endangered. When the origin of the fire came to be traced out, it was found that it was due to one brick being left out in a flue. A penny would be a high estimate of the cost of that brick and of the expense of laying it, yet, through the neglect of that pennyworth, £2,000 damage was done, and risk of human life was run. I think there is a moral in this story which each of us can make out if he will.— *The Building News.*

ESTIMATES ON DESIGNS PUBLISHED.

Architects, contractors, and builders, wishing to ascertain the cost of material for any of the competition designs published, when the cost is not stated, have only to write to the company or companies whose bricks are specified, stating the year and number of the plate on which the design is shown, and any particulars as to color of bricks, size of job, method of shipment, and the manufacturers will take pleasure in promptly quoting prices. The addresses of the different manufacturers may be found in our advertising columns.

CORRESPONDENCE.

SAVANNAH, ILL.

THE BRICKBUILDER, Boston, — Have just received copy of BRICKBUILDER with article "Sell more Bricks" marked. A good way to have more bricks sold is to build more brick houses, and a good way to have more people build more brick houses is to publish "taking" designs for brick houses. Now, I want to build several cheap houses for rent, and would as soon build of brick as any way, if I could get designs to suit. Can you help me out, or do you know who can? I enclose stamped envelope.

Respectfully, L. G. BURROWS.

We would advise our correspondent to secure the services of a competent architect unless he wishes to build the cheapest houses that will rent. If he must limit the cost to $800 or $1,200, he had best secure the services of a contractor or builder on whom he can thoroughly depend, and build a house of simplest design, in the best

manner his funds will allow. No ornamental work, adding to the cost of the building, should be applied. After all, we believe the commission paid an architect for making quarter-scale plans, elevations, and specification would be well expended. A plain brick wall, of commonest bricks, can, with intelligent treatment, be made very attractive. A house so built, with the arrangement of wall space and windows well considered, costs no more to put up than a house designed without any regard for effect obtainable by this means. The cost comes in, in securing the services of a man who knows how to do it, and this extra cost is very slight. A rough brick wall may look bare when first built, but let our correspondent plant around his new houses a few roots of the ivy that shingles with green so many Boston brick fronts (Ampelopsis Veitcheii is the botanical name), and in two years there would be nothing in Savannah more attractive.

We hope our competition for a $2,000 brick house, announced in this number, will bring in enough designs to provide suggestions for many who, like our correspondent, wish to build small houses of brick instead of wood.

BOOKS AND PAPERS.

We are in receipt of a copy of the second edition of *Hendricks's Architects' and Builders' Guide and Contractors' Directory of America*, for 1892–93, published by Samuel E. Hendricks & Co., 44 and 46 Broadway, New York.

We take pleasure in noticing this publication as it so far surpasses anything of the kind we have ever seen in arrangement and completeness. Usually these "Directories" are local affairs, originated with the sole purpose of affording opportunity to solicit advertisements, and having no real value to any one except the publishers. They usually have a nominal price, but the few copies printed are distributed free, going largely to the advertisers as proof that their advertisements have been printed. These advertisements are hardly worth the paper they are printed on.

Messrs. Hendricks & Co. have approached this work with the broader, more far-sighted view of giving their book a value, first as a directory, and second as an advertising medium, evidently realizing that the latter is dependent upon the former. They have given lists, which are almost marvellous in their completeness and correctness, of all trades and industries relating in any way to the building interests of the country. These lists are admirably arranged, their typography is the best, and the number of special paid-for headings, which in the many "so-called" directories occupy a large proportion of space, is surprisingly small. There are comparatively few advertisements scattered through the directory part, and these never interfere with the lists by breaking into them. They are, for the most part, printed on special leaves inserted at the right place. The well-arranged index of headings is also a noticeable feature.

The cost of the book, $5.00, insures an *effective* circulation, for no one would buy it but for its use. It is really indispensable to every firm supplying building materials of any sort, and architects would find it advantageous to have a copy for reference when addresses of supply firms are wanted.

THE BRICKBUILDER COMPETITIONS.

RULES: All drawings must be sent in marked with some motto or device, and accompanied by a sealed envelope marked with the same, containing the full address of the competitor. The designs are judged by a committee of well-known architects, solely upon their merits, the names of the designers remaining unknown until the award is made, when the sealed envelopes corresponding to the devices on the designs are opened. To protect the interests of our advertising patrons it is stipulated that no ornamental bricks not found in their catalogues shall be used. This is really no restriction, for practically all of the leading manufacturers will be found represented in The BRICKBUILDER. To encourage the study of effective use of the commoner materials, of two designs equally good, preference will be given that showing a skilful use of ordinary bricks to secure ornamental effect.

COMPETITION NO. 3. AWARD.

Programme. It is required of the competitor to design three brick cornices of varying heights. These heights will not exceed seven, thirteen, and twenty courses respectively. Bricks on edge will be considered a course. Simple forms are advised and a skilful use of ordinary bricks will count for more than an elaborate combination of ornamental ones. The gutter will be of terra-cotta or copper, and will be additional.

Nineteen designs were submitted besides that of "Old Dominion," which was barred from competition owing to tardy arrival. Fourteen of the competitive designs are published in our plate department, prizes being awarded as follows: —

Plate 49. First prize, $10, "Siena," J. T. Maclaren, Philadelphia, Pa.

Plate 50. Second prize, $7.50, Coat-of-Arms, Jas. C. Green, St. Louis. Third prize, $5, "Cornish," W. W. DeVeaux, New York City.

Plate 51. Two fourth prizes, $3.50 book, competitor's selection. "Classicus," Will S. Aldrich, Somerville, Mass., and "Nixy," Raymond F. Bocorselski, Hartford, Conn.

Plates 52 and 53. Four fifth prizes, subscriptions to THE BRICKBUILDER for 1892. The Rising Sun, Max Foester, St. Paul, Minn. "Allesame," Harry Edward Prindle, New York City. Black Cross in Circle, H. G. Fletcher, Somerville, Mass., and "Brique," G. F. Crump, Albany, N. Y.

Plates 54, 55, and 56. Designs awarded honorable mention. To these competitors the paper will be sent free for the last half of the present year. "Don," W. P. Crabtree, New Britain, Conn. "Non Nemo," Chas. H. Cullen, Hartford, Conn. "Bricco," Frank W. Whiton, Hartford, Conn. "Pluto," Louis Sonntag, Philadelphia, and "Renaissance," Walter H. Volckening, Brooklyn, N. Y. "Old Dominion" is published without award by consent of its author, H. W. Olcott, Richmond, Va.

JUDGMENT IN COMPETITION NO. 3.

The designs for cornices submitted in this competition were, on the whole, so excellent and so varied, that the task of the jury in placing them in order of merit was not an altogether easy one, especially as in several cases the merit of the three cornices shown was unequal, so that a sheet containing, for instance, one very good design with two poorer ones took a lower place than the single design taken by itself would have entitled it to. It was stated in the programme that a skilful use of ordinary bricks would count for more than an elaborate combination of ornamental ones; for this reason and on account of the excellence of the profiles, the picturesque and varied play of light and shade, and the distinctively brick character of the designs, the sheet of cornices by "Siena" was placed first. Rich as is the effect produced, hardly any moulded brick occur, and these are of very simple form. The method of rendering here adopted is also to be especially commended as it shows clearly the effect of the design, and is not a mere working drawing of a cornice, as are most of the others. In the largest of the three cornices, the small brackets, No. 509 Ph. B., are somewhat too small for their position and the weight of cornice they carry, and at the height from the ground at which a cornice of this size would presumably be placed they would not tell as they ought to.

The designs distinguished by a coat-of-arms are placed second. They are not as rich in effect as those of "Siena," although the means employed are more elaborate. But the profiles are firm and bold, the designs have a distinctively brick character, though not so much so as those of "Siena," and are well proportioned; and while using rich detail in appropriate positions and with good knowledge of effect, are commendable in their dignified restraint. The increasing boldness in treatment as the size of the cornice increases shows a thoughtful appreciation of what would be required by the presumably greater height of the buildings to which the larger cornices belong.

"Cornish" also shows a commendable and effective treatment of cornices, which have a distinctively brick character and are well proportioned. The profiles follow too closely a single raking line. In this respect the central design is better than the other two. The gutter mouldings have too sharp an outline and too great projection. The largest cornice would have been much improved by having a plain projecting facia below the upper egg and dart course, in place of two of the moulded courses. In their position it would be better if at least every alternate brick were a header to tie these projecting courses securely to the wall.

"Classicus" submits some excellent designs, thoroughly brick in character and rich in effect. But there is a certain confusion of parts, and a want of perfect justness in proportion, which prevents these designs from taking a higher place. For instance, the central design, which is the least successful of the three, is too much like

two cornices of differing design, superimposed one on the other. Taken as a whole, the brackets do not come in the right place in the cornice.

"Nixy" is thoroughly brick in character and commendable for the very simple means employed. But although these designs would look much better when built than they do in the rather poor rendering of this sheet, and though the profiles are fairly good, there is too much sameness and lack of interest, which even with the simple means employed might have been avoided. The largest design is the least successful.

The Rising Sun shows three excellent cornices, well proportioned, of pure and refined profile; but, though suitable for execution in brick, there is nothing distinctively brick in their character. They might with equal propriety be executed in stone or terra-cotta. But for this they would have been accorded a much higher place. The facia of the central one, indeed, has a somewhat too great projection for a single course of brick, and being the top course would have to be tied down in some way to remain in place.

"Allesame" has three very interesting designs, which, however, would be more suitable executed in terra-cotta than in brick. The profile of the lower design might easily be improved and the guilloche ornament is not quite in place in the position given to it.

Black Cross in Circle gives three good and appropriate designs, but not as interesting as those previously named. The simple little cornice at the top of the sheet is the best of the three. The lower design might be very effective in certain positions, but is not of great interest taken by itself.

The designs of "Brique" are appropriate but somewhat commonplace. The brick pattern used in the larger cornice is not good in that the joints come so frequently over each other. A good brick pattern should follow naturally from the use of some good brick bond.

The designs by "Don," "Non Nemo," "Bricco," "Pluto," and "Renaissance" are also worthy of mention. The two lower designs of "Don" are interesting in that no moulded brick whatever are employed, but more interesting results could have been obtained with this limitation. The projecting courses should have been headers, not stretchers.

"Old Dominion," coming in too late, was *hors de concours*, but his designs are worthy of publication, and are therefore put in, though not as one of the designs of the competition.

THE COST OF THE CORNICES.

With a view to making this special cornice number of more practical value by saving subscribers the time and trouble of estimating the cost, we have, from the price lists of the several companies whose bricks are used, figured the cost of the face and ornamental brick per running foot. Face brick have been figured at $30 per thousand, which is higher than the ordinary price. Prices include packing and delivery on board the cars at Boston for the Philadelphia & Boston Face Brick Co.; New York for the N. Y. Anderson Pressed Brick Co.; Winslow Junction for the Eastern Hydraulic Press Brick Co.; Philadelphia for the Peerless Brick Co.; Washington for the Washington Hydraulic Press Brick Co.; Akron, O., for the Akron Vitrified Press Brick Co., and St. Louis or Belleville, Ill., for Anthony Ittner of St. Louis. While these estimates are practically correct, THE BRICKBUILDER does not guarantee them, for it cannot hold itself responsible for changes in price lists, or variations between its own and the different makers' methods of estimating. It is well, therefore, to consider them approximate only, allowing a few cents per foot for differences, and to write the manufacturers for exact figures when building is contemplated, giving total length of cornice to be built. The prices are for red brick in all cases, and the terra-cotta or metal gutter is *not* included. In correspondence with any of the manufacturers it will be necessary only to mention the designs, as they are mentioned in THE BRICKBUILDER, *i. e.*, first, second, or third design (counting downward), of "Siena," or "Cornish," or whatever motto the designs carry.

PLATE 49.

"Siena," . . . . No. 1, $0.64. No. 2, $1.02. No. 3, $1.99.

NOTE: Pattern numbered 54 should be 541, there being no No. 54 in the catalogue, and the pattern used corresponding to No. 541.

PLATE 50.

Coat-of-Arms, . . No. 1, $0.86. No. 2, $1.35. No. 3, $2.84.
"Cornish," . . . No. 1, $0.56. No. 2, $1.62. No. 3, $2.42.

PLATE 51.

"Classicus," . . No. 1, $0.93. No. 2, $2.58. No. 3, $2.85.

NOTE: In No. 1 A100 and A100a, should be A101 and A101a.

"Nixy," . . . . No. 1, $0.63. No. 2, $0.90. No. 3, $1.86.

NOTE: In No. 1 Ittner's 38 is numbered 62 in 1892 catalogue.

PLATE 52.

"Allesame," . . No. 1, $0.78. No. 2, $1.03. No. 3, $1.92.
Black Cross in Circle, No. 1, $0.67. No. 2, $1.125. No. 3, $2.55.

PLATE 53.

Rising Sun, . . . No. 1, $0.66. No. 2, $0.95. No. 3, $1.53.
"Brique," . . . No. 1, $0.70. No. 2, $1.10. No. 3, $2.04.

PLATE 54.

"Don," . . . . No. 1, $0.82. No. 2, $0.60. No. 3, $0.98.

NOTE: The Akron vitrified pressed bricks are supplied at $20 per thousand.

"Non Nemo," . . No. 1, $1.05. No. 2, $0.94. No. 3, $3.67.

PLATE 55.

"Bricco," . . . . No. 1, $0.65. No. 2, $1.31. No. 3, $2.74.
"Pluto," . . . . No. 1, $0.75. No. 2, $1.83. No. 3, $2.48.

PLATE 56.

"Renaissance," . . No. 1, $1.15. No. 2, $1.74. No. 3, $1.80.
"Old Dominion," . No. 1, $1.07. No. 2, $1.42. No. 3, $2.99.

NOTE: As all face bricks here specified are Washington Hydraulic Press, they are figured in at $21 per thousand, the price quoted us by that company, instead of $30 as in the other designs, except that of "Don."

COMPETITION NO. 7.

DESIGN FOR A BRICK HOUSE TO COST $2,000.

Programme. It is supposed that the designer has a client who proposes to buy a lot of 40 feet front and 120 feet deep in a suburban town or village, the streets of which run north and south and east and west. The designer may choose his own position of lot, that is, he may have it facing north, east, south, or west as he prefers, and the plan of his house will be considered in relation to this choice. His client is limited in expenditure to $2,000 for the house, exclusive of plumbing and heating apparatus, which he expects to add later, therefore provisions must be made for them. He must have a parlor or living-room, a dining-room, a kitchen with pantry and necessary closets, etc., and a staircase-hall or vestibule on the first floor, unless the stairs can be arranged to lead from the living-room. Three chambers, with necessary closets, and a bath-room, must be provided upstairs. Designers will be allowed two sheets, 18 x 24 inches, within border lines, upon which to make drawings. Plans of cellar and each floor, a front and side elevation, all to same scale, with necessary details to a larger scale, a perspective showing front and the side not shown in elevation, and a block plan of the lot showing location of house and arrangement of ground, are required. The clever placing of the house and the laying out of the yard will count in the competition, as much depends upon these points. Graphic scales for the plans, elevations, and details must be put on. The designer is restricted to the use of the two patterns of moulded bricks corresponding to 555 and 564 of the N. Y. Anderson Co., 56 and 55 of Ittner's catalogue, or 11 and 10 of the Hydraulic Press Brick catalogue. Accompanying the design must be a brief description of the materials and construction used, so that from these notes a specification could be written, and, if possible, an estimate from some responsible builder must be secured, else the jury will have to decide whether or not the design comes within the limit placed. Drawings must be delivered carriage paid at the office of THE BRICKBUILDER on or before Dec. 1, 1892.

For the four best designs equal prizes of $25 each will be awarded. The publishers reserve the right to publish any or all the other designs, and in each instance of so doing will give the author $5 and a free subscription to THE BRICKBUILDER for 1893.

THE ILLUSTRATIONS.

All the plates, 49 to 56 inclusive, are devoted to the results of our third competition, of which full particulars, together with the criticism of the jury, are given in the department of competitions on page 55.